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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/554,415	10/24/2005	Thomas Sugar	09049-00004-US1	5350
30678 7590 11/17/2009 CONNOLLY BOVE LODGE & HUTZ LLP 1875 EYE STREET, N.W. SUITE 1100 WASHINGTON, DC 20006				
EXAMINER				
MATTER, KRISTIN CLARETTE				
ART UNIT		PAPER NUMBER		
3771				
MAIL DATE		DELIVERY MODE		
11/17/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/554,415

**Applicant(s)**

SUGAR ET AL.

**Examiner**

KRISTEN C. MATTER

**Art Unit**

3771

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 September 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18, 20-28 and 30-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18, 20-28, and 30-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This Action is in response to the amendment filed 9/9/2009. Claims 1, 4-7, 10-18, 20-28, 30-33, and 35 have been amended, claims 19 and 29 have been cancelled, and no claims have been added. Thus, claims 1-18, 20-28, and 30-36 are pending in the instant application.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-7, 10, 14, 15, 17-18, 21, 22, 24, 33, and 36 are rejected under 35**

**U.S.C. 102(b) as being anticipated by Negishi et al. (US 5,158,005, herein referred to as “Negishi”).**

Regarding claims 1, 10, 14, 33, and 36, Negishi discloses a muscle actuator comprising an inner bladder (12) comprising a first end and a second end (see Figure 1) and the inner bladder being configured to communicate with a pneumatic source (column 2, lines 25-35), a braided material (14) wrapped over at least a substantial portion of the inner bladder (see Figure 1), an end fitting (16) attached to each of the first end and the second ends, and a helical spring (28) positioned over at least a portion of the braided material and between the first and second ends (see Figure 3b where at least 3 coils are clearly seen as extending over the braided material and between the first and second ends of the bladder). When pressurized fluid is introduced into a passage (24) in the bladder, the actuator expands axially compressing the coil spring (column

2, lines 30-35 and Figure 3a) and when the pressurized fluid is exhausted from the bladder the spring generates a pushing force (column 4, lines 40-45). Additionally, the spring can be said to be coupled in parallel with the bladder since the diameter of the spring is essentially parallel to the diameter of the bladder (examiner is unclear how one can clearly define a mechanical series or parallel arrangement (as opposed to an electrical arrangement) in which the broadest reasonable interpenetration wouldn't include seeing if the devices themselves were in a parallel spaced relation (as opposed to perpendicular for example)).

Regarding claim 2, the muscle actuator of Negishi would inherently have a control mechanism (i.e., a valve for example) for controlling the amount of flow of a pneumatic source into and out of the inner bladder otherwise pressurized fluid would not be able to be supplied to the bladder as required by Negishi to operate the device.

Regarding claims 3 and 15, the spring of Negishi is mounted over at least a portion of the braided material (see Figure 3b), and since the spring appears to lie over top all other layers it can be considered as being mounted over the muscle actuator.

Regarding claims 4-7, 18, 21, and 22, Negishi further discloses two telescoping tubular shell members (22) positioned over at least a portion of the braided material and a clamping device attached to each end of the spring (column 4, lines 45-55).

Regarding claim 17, as seen in Figure 3a, the spring is mounted adjacent the muscle actuator. "Adjacent" simply means "not distant" and the spring can be considered to lie adjacent for several reasons (i.e., cause part of it lies to the side of the bladder or cause part of it lies overtop of the bladder)

Regarding claim 24, the spring of Negishi is clamped in a stretched position so that it is compressed when the telescoping members expand (see Figure 3a). Upon removal of the force created by the pneumatic source, the compressed spring exerts a force that more quickly returns the telescoping portions to their original position (column 4, lines 35-45).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 11-13, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Negishi.**

Regarding claims 11-13, 34, and 35, Negishi discloses an elastic member for providing quicker return of the extensible member to its original length and gives a coil spring as an example (column 4, lines 40-50). Negishi does not specifically disclose a shock absorber. However, shock absorbers are well known and commonly used for quick return of extensible members (see cited art and also applicant's specification paragraph 58 in which shock absorbers are discussed as being prior art devices). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have replaced the spring of Negishi with a shock absorber in order to provide a well known and commonly used means for quickly returning the extensible member to its original length and to allow more accurate control over the

speed of return. Furthermore, there is nothing structurally that would prevent such a modification and it appears that the device of Negishi would perform equally well with a shock absorber (or any other elastic means capable of quickly returning the member to its original length). The specific type of shock absorber (i.e., locking compression gas spring-type) is considered an obvious design consideration to one of ordinary skill in the art depending on the specific application the actuator is being used for and the needed control with extension and compression of the device.

**Claims 1, 2, 10-18, 21, 22, 24, and 33-36 rejected under 35 U.S.C. 103(a) as being unpatentable over Negishi in view of Chiel et al. (US 2003/0065250).** Negishi discloses the claimed device as discussed above with respect to claims 1-7, 10-15, 17, 18, 21, 22, 24, and 33-36. However, to the extent that the spring of Negishi is not entirely positioned between the first and second ends of the bladder (although examiner believes this limitation is not required by the claim language) and/or that the spring is not coupled in parallel since the majority of the spring is positioned axially from the bladder not radially (although again examiner does not believe this limitation is required by the claim language), Chiel et al. is cited as disclosing an expandable actuator with a spring mounted into the bladder to restore the bladder to its original shape (abstract). This would clearly place the spring between the first and second ends of the bladder and in parallel with the bladder. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have moved the spring of Negishi to inside the bladder as taught by Chiel et al. in order to reduce the overall dimensions of the actuator or to prevent a user from getting pinched by the spring for example. Furthermore, there is nothing structurally

preventing the spring from being mounted inside the bladder and it appears as though the device of Negishi would perform equally well with the spring mounted inside the bladder. Such a modification would appear to involve the mere substitution of a well known method (spring inside an extensible bladder) into another (device of Negishi) to yield predictable results that do not patentably distinguish an invention over the prior art.

**Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Negishi as applied to claim 1 above, and further in view of Brook et al. (US 4,875,469).**

Regarding claim 8, Negishi does not disclose an elongated shell positioned over the spring. However, Brook et al. discloses a muscle actuating device with an elongated shell mounted over a spring (see Figure 5). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have positioned a shell over the spring as taught by Brook et al. in the device of Negishi in order to minimize the risk of a user getting pinched by the spring when it is compressed for example. Furthermore, it appears as though the device of Negishi would perform equally well with a shell positioned over the spring so long as the spring could still be compressed and expanded because there is nothing structurally from preventing the addition of another shell and it is well known and common practice to place a shell over a spring to protect both the spring and a user.

Regarding claim 9, the annular projection (see Figure 3b) where the spring is attached to the shell can be considered a disc comprising an opening that is mechanically coupled to one end of the spring.

**Claims 20, 25-28, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Negishi as applied to claim 10 above, and further in view of Barclay (US 3,976,057).**

Regarding claim 20 and 25-28, Negishi is silent as to the muscle actuator specifically being used with a knee brace having a pivoting member. However, Barclay discloses a knee brace with pneumatic actuators mechanically coupled to the brace for providing flexion and extension of the knee. Barclay further discloses the two actuators as mounted in parallel on different sides of a pivot arm (18, 19) having a pivot joint (22) of the knee brace. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the actuators of Negishi with a pivoting knee brace as taught by Barclay because it would have allowed a user to quickly extend and flex their knee as needed with the assistance of a pneumatic actuator. Furthermore, it appears that the device of Negishi would perform equally well if used to assist movement of any hinge joint by being coupled to a brace surrounding that joint.

Regarding claims 31 and 32, depending on the application of the device the number of devices being used and the use of pivoting joints is considered an obvious design consideration to one of ordinary skill in the art (for example, using the actuators for movement of two hinge joints on a hand or leg would require several pivoting members and muscle actuators).

**Claims 20, 25-28, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Negishi and Chiel et al. as applied to claim 10 above, and further in view of Barclay (US 3,976,057).**



Regarding claim 20 and 25-28, Negishi as modified by Chiel et al. is silent as to the muscle actuator specifically being used with a knee brace having a pivoting member. However, Barclay discloses a knee brace with pneumatic actuators mechanically coupled to the brace for providing flexion and extension of the knee. Barclay further discloses the two actuators as mounted in parallel on different sides of a pivot arm (18, 19) having a pivot joint (22) of the knee brace. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the actuators of the modified Negishi device with a pivoting knee brace as taught by Barclay because it would have allowed a user to quickly extend and flex their knee as needed with the assistance of a pneumatic actuator. Furthermore, it appears that the modified device of Negishi would perform equally well if used to assist movement of any hinge joint by being coupled to a brace surrounding that joint.

Regarding claims 31 and 32, depending on the application of the device the number of devices being used and the use of pivoting joints is considered an obvious design consideration to one of ordinary skill in the art (for example, using the actuators for movement of two hinge joints on a hand or leg would require several pivoting members and muscle actuators).

**Claims 23 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Negishi as applied to claims 10 and 22 above, and further in view of Coffey (US 1,928,368).**

Regarding claim 23, Negishi is silent as to the spring being clamped in a compressed position when the actuator is in a starting position. However, Coffey discloses an expandable/contractible bladder with a spring clamped in a compressed position to start (see Figure 3; since a jack raises a car it appears that the spring is compressed to start). When the

pneumatic force is removed, the spring pulls the actuator back to its original dimension. Therefore, absent a critical teaching and/or showing of unexpected results from having the spring clamped in a stretched or compressed position to start, examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have clamped the spring in either a compressed or stretched position to start depending on the particular application the actuator is being used for. Furthermore, it appears as though the device of Negishi would perform equally well with the spring being clamped in a compressed position to start so long as the spring was able to exert enough force to help restore the actuator to its starting length.

Regarding claim 30, Coffey discloses the spring attached to flanges (see Figure 5). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have attached the mechanical devices of Negishi to flanges as taught by Coffey because it would have provided some space between the bladder and spring or between the actuators and a limb so as to avoid interference with the operation of the actuators. Plus, it appears as though the device of Negishi would perform equally well with flanges in order to give a mounting surface for the spring.

**Claims 23 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Negishi and Chiel et al. as applied to claims 10 and 22 above, and further in view of Coffey (US 1,928,368).**

Regarding claim 23, Negishi as modified by Chiel et al. is silent as to the spring being clamped in a compressed position when the actuator is in a starting position. However, Coffey

discloses an expandable/contractible bladder with a spring clamped in a compressed position to start (see Figure 3; since a jack raises a car it appears that the spring is compressed to start). When the pneumatic force is removed, the spring pulls the actuator back to its original dimension. Therefore, absent a critical teaching and/or showing of unexpected results from having the spring clamped in a stretched or compressed position to start, examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have clamped the spring in either a compressed or stretched position to start depending on the particular application the actuator is being used for. Furthermore, it appears as though the modified device of Negishi would perform equally well with the spring being clamped in a compressed position to start so long as the spring was able to exert enough force to help restore the actuator to its starting length.

Regarding claim 30, Coffey discloses the spring attached to flanges (see Figure 5). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have attached the modified mechanical devices of Negishi to flanges as taught by Coffey because it would have provided some space between the bladder and spring or between the actuators and a limb so as to avoid interference with the operation of the actuators. Plus, it appears as though the modified device of Negishi would perform equally well with flanges in order to give a mounting surface for the spring.

### ***Response to Arguments***

Applicant's arguments filed 9/9/2009 have been fully considered but they are not persuasive.

As discussed above, at least part of the spring is positioned between the first and second ends of the bladder and thus reads on the instant limitations of claim 1. Additionally, since the diameters of the spring and bladder are coupled in parallel, the devices can be considered to be in parallel as most broadly reasonably interpreted by the examiner in claims 10 and 33.

However, in an effort to speed up prosecution and to the extent that the new wording was added to the claims in an attempt to define over the prior art, examiner has also rejected the independent claims off of Negishi and Chiel et al., which clearly read on the limitations of being positioned between the first and second ends and coupled in parallel as argued by the applicant in the remarks section.

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KRISTEN C. MATTER whose telephone number is (571)272-5270. The examiner can normally be reached on Monday - Friday 9-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Justine Yu can be reached on (571) 272-4835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kristen C. Matter/  
Examiner, Art Unit 3771

/Justine R Yu/

Supervisory Patent Examiner, Art Unit 3771